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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,401	04/10/2006	Kazuo Hara	NNA-111-B	3767

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EXAMINER	
LICHTI, MATTHEW L	
ART UNIT	PAPER NUMBER
3663	

NOTIFICATION DATE	DELIVERY MODE
12/26/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@youngbasile.com
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Office Action Summary	Application No.	Applicant(s)	
	10/575,401	HARA ET AL.	
	Examiner	Art Unit	
	Matthew Lichti	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *4/10/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/1/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application 2004-361986 filed in Japan on 12/14/2004. It is noted, however, that applicant has not filed a certified copy of the foreign priority application as required by 35 U.S.C. 119(b).

Claim Objections

2. Claim 13 is objected to because the preamble "a vehicle for controlling road wheels of the vehicle comprising" is unclear. It should be changed to -- a device for controlling road wheels of a vehicle comprising – or -- a vehicle with road wheels comprising -- or something similar to make it clear that there is only one vehicle.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims **1, 3, 6, 7, 9, 12-14, 16**, and **19** are rejected under 35 U.S.C. 102(b) as being anticipated by Kato et al. (U.S. 6,082,482).

5. Regarding claim 1, Kato et al. disclose a steering control device for use in a vehicle having a steering wheel that receives steering input, and an electronically-

controlled steering unit that turns the vehicle's wheels over a road surface based on the position of the steering wheel, comprising:

a reaction force device (fig. 1, reaction force actuator 3) coupled to the steering wheel (2) and responsive to a control signal (reaction force torque signal from steering control unit 4) to apply a steering reaction force to the steering wheel (col. 6, lines 7-13);

a hands-free sensor (fig. 1, steering control unit 4, vehicle speed sensor 6, torque sensor 32) adapted to generate a signal indicative of whether the steering wheel is in a hands-on state or a hands-off state (fig. 3, col. 7, lines 15-29; col. 5, lines 27-29); and

a controller (steering control unit 4, reaction force inhibitor, col. 5, lines 29-31) adapted to vary the control signal in response to the hands-free sensor signal to reduce the steering reaction force applied when the hands-off state is indicated relative to the steering reaction force applied when the hands-on state is indicated (fig. 4, signal varied to stop reaction force R8 if R4 is YES, col. 7, lines 11-14; fig. 10, col. 11, lines 1-11).

6. Regarding claim 7, Kato et al. disclose a vehicle having road wheels (fig. 1, wheels 10), comprising:

a steering unit (steering wheel 2);

an electronically-controlled turning unit (steering motor 5) responsive to the steering unit (2) which turns the road wheels based on the position of the steering unit (col. 5, lines 22-27) ;

a steering reaction force applicator (3) adapted for applying a steering reaction force to the steering unit (col. 5, lines 21-22);

a hands-free sensor (fig. 1, steering control unit 4, vehicle speed sensor 6, torque sensor 32) adapted for detecting whether the steering unit is in a hands-off state or a hands-on state (fig. 3, col. 7, lines 15-29; col. 5, lines 27-29); and

a steering reaction force correction component (reaction force inhibitor, col. 5, lines 29-31) adapted for reducing the steering reaction force applied when the hands-off state is detected relative to the steering reaction force applied when the hands-on state is detected (fig. 4, reaction force R8 reduced to zero if R4 is YES, col. 7, lines 11-14).

7. Regarding claim 13, Kato et al. disclose a vehicle (fig. 1) for controlling road wheels (10) of the vehicle comprising:

means (motor 5) for turning the road wheels (10) in response to a steering input of a steering unit (steering wheel 5, col. 5, lines 22-27);

means (reaction force actuator 3) for applying a steering reaction force to the steering unit (col. 5, lines 21-22);

means (fig. 1, steering control unit 4, vehicle speed sensor 6, torque sensor 32) for detecting whether the steering unit is in a hands-on or hands-off state (fig. 3, col. 7, lines 15-29; col. 5, lines 27-29); and

means (reaction force inhibitor, col. 5, lines 29-31) for reducing the steering reaction force in the hands-on state when the hands-off state is detected (fig. 4, reaction force reduced to zero if R8 if R4 is YES, col. 7, lines 11-14).

8. Regarding claim 14, Kato et al. disclose a method for controlling the road wheels of a vehicle comprising:

turning the road wheels from a steering input via a steering unit (col. 5, lines 22-27);

applying a steering reaction force to the steering unit (col. 5, lines 21-22);

detecting whether the steering unit is in a hands-on or hands-off state (fig. 3, col. 7, lines 15-29; col. 5, lines 27-29); and

reducing the steering reaction force applied when the hands-off state is detected relative to the steering reaction force applied when the hands-on state is detected (col. 5, lines 29-31, fig. 4, reaction force reduced to zero if R8 if R4 is YES, col. 7, lines 11-14).

9. Regarding claims 3, 9, and 16, Kato et al. disclose a steering angle detection sensor (rotary encoder 33) adapted to generate a signal indicative of the steering angle of the steering wheel; wherein the steering reaction force device is further adapted to apply a steering reaction force corresponding to the steering angle (col. 8, lines 4-10); and wherein the controller is further adapted to reduce the reaction force corresponding to the indicated steering angle when the hands-off state is indicated (fig. 4, reaction force R8 reduced to zero if R4 is YES, col. 7, lines 11-14; fig. 10, col. 11, lines 1-11).

10. Regarding claims 6, 12, and 19, Kato et al. disclose a steering torque detection sensor (torque sensor 32) adapted to generate a signal indicative of steering torque (Ts, col. 8, lines 9-14; fig. 5 step 32); and wherein the controller is further adapted to reduce the reaction force when the indicated steering torque decreases and the hands-off state is not indicated (fig. 4, reaction force R8 reduced to zero if R4 is YES, col. 7, lines 11-14)

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims **2, 8,** and **15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (U.S. 6,082,482) in view of Higashira et al. (U.S. 5,908,457).

13. Regarding claims 2, 8, and 15, Kato et al. disclose calculating and applying reaction force (fig. 5) and reducing all components of the reaction force to zero when the hands-off state is indicated.(col. 7, lines 11-14) but does not disclose that road surface force is used to calculate the reaction force.

Higashira et al. teach steer-by-wire system with a road surface reaction force sensor adapted to generate a signal indicative of road surface reaction force (fig. 1, sensors 7b, 7c, & 7d determine the friction coefficient of the road surface), wherein the reaction force device is further adapted to apply the steering reaction force corresponding to the indicated road surface reaction force (col. 9, lines 44-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the steer-by-wire system that reduces reaction force to zero when a hands off state is detected of Kato et al. to include using a using road surface friction to calculate the reaction force as taught by Higashira et al. because the reaction force is supposed to replicate the feeling of a mechanically coupled steering

wheel and the road surface friction effects the feeling of steering a mechanically coupled steering wheel.

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14. Claims **4, 5, 10, 11, 17**, and **18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (U.S. 6,082,482) in view of Serizawa et al. (U.S. 5,347,458)

15. Regarding claims 4, 5, 10, 11, 17, and 18 Kato et al. disclose detecting steering angular velocity from taking a derivative of the steering angle (col. 9, lines 41-43), calculating and applying reaction force from factors that include a derivative of a torque corresponding to a steering angle (fig. 5, col. 8, lines 5-17), and reducing all components of the reaction force to zero when the hands-off state is indicated (col. 7, lines 11-14), but do not disclose that the steering angular velocity or steering angular acceleration (first and second derivatives of steering angle) is used to calculate the reaction force.

Serizawa et al. teach a steer by sire system with steering angle velocity and acceleration detection sensors adapted to generate a signal indicative of the steering angle velocity and acceleration (steering angle obtained from potentiometers 3 and 4 and encoder 5, col. 5, lines 2-3, derivatives taken, col. 5, lines 21-26); wherein the steering reaction device applies a steering reaction force corresponding to the indicated steering angle velocity and acceleration (col. 7, lines 8-18, fig. 4c);

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the steer-by-wire system that reduces reaction force to

zero when a hands off state is detected of Kato et al. to include using steering angle velocity and/or steering angle acceleration to calculate the reaction force as taught by S et al. because the reaction force is supposed to replicate the feeling of a mechanically coupled steering wheel and steering velocity and acceleration effects the feeling of steering a mechanically coupled steering wheel.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Aoki et al. (U.S. Pub. 2003/0217885) teach a steering control apparatus that applies reaction force to the steering wheel and reduces reaction force when a hands-off state occurs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Lichti whose telephone number is (571) 270-5374. The examiner can normally be reached on Monday - Friday 8:30 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571)272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. L./
Examiner, Art Unit 3663

/Jack W. Keith/

Supervisory Patent Examiner, Art Unit 3663